EVOLGEN FIELDWORK

Introduction

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Cepaea nemoralis (the grove/ brown-lipped snail), the type species of its genus, is commonly used as a model organism. This species was chosen for study, as their polymorphs show clear phenotypic physical differences; i.e. in colour and banding pattern. Furthermore, they move relatively very short distances over their lifetimes, thus it is with relative ease that we can attribute a snail to its respective population – limiting the effect of sampling error in comparison to other model organisms that could have been selected for this study. Separate populations can be sampled, and their phenotypic differences analysed and quantified to allow us to make the distinction between whether genetic drift, selection, or both function.

We hope to determine the mechanisms of variation by sampling independent snail populations. We hypothesised that if genetic drift and gene flow were present with weak/ no selection – polymorphs collected in independent areas would have similar features (H_0). When genetic drift and gene flow occur with some selection – polymorphs collected in independent areas would not be the same (H_A). If selection (over a background of drift) causes the distribution of the snail polymorph populations, then the same colour and banding pattern of snails should be found in the same habitats across the sampling area. On the other hand, if the distribution is caused by genetic drift alone, then the different sampling sites will be independent of the others, and thus the distribution should be more random, i.e. the same type of habitat may have snails with both different colours and different banding patterns.

It is our plan to collect six sample populations of approximately 20-30 snails each in 2 sets of three locations around the field. Two samples will be collected in the trees, two samples in the open grass, and two samples from an intermediate habitat - the bushes. Each shall be separated by at least 20 metres, to ensure the populations are distinct. Moreover, the sampling design follows two vertical transects of the field, with all samples taken at approximately the same elevation, in order to eliminate the altitude variable. Finally, sampling two spatially distinct sets of three conditions (a gradient from forest to open grass with bush as an intermediate) reduces the likelihood of introducing pseudoreplication[1].
Our sampling design is illustrated below, using crosses to identify samples. Distinguishable snail features will be discussed within the group prior to sample collection, to ensure consistency of sampling features; for instance, snail colour and banding patterns.

[1] Stuart Hurlbert. (1984). PSEUDOREPLICATION AND THE DESIGN OF ECOLOGICAL FIELD EXPERIMENTS. *Ecological Monographs*. 54 (2), p187-211.